MODEL 41-3A

REMOTE CONTROL OPTION

INSTALLATION AND OPERATION

A0041-13-604

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1. INTRODUCTION

1.01 This manual contains instructions for installing a Remote Control (RC) Option in a Model 41-3A Central Office Service Analyzer. Information for operating a Model 41-3A equipped with the Remote Control Option (Model 41-3A w/RC) is also included.

1.02 As shown in Table A, the RC Option is one of several products associated with the Model 41-3A. The RC Option is available as a factory-installed feature of the Model 41-3A (NED 0041-13-905), or it can be provided as a kit (NED 0041-13-904) for retrofitting a basic Model 41-3A.

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TABLE A

PRODUCT LIST

PART NUMBER	DESCRIPTION
0041-13-900	Basic Model 41-3A (without options)
0041-13-901	Multifrequency (MF) Option (for the 0041-13-900 only)
0041-13-902	Teleprinter (TTY) Option (for the 0041-13-900 only)
0041-13-904	Remote Control (RC) Option kit (for field retrofitting of a 0041-13-900; this option includes all TTY Option functions)
0041-13-905	Model 41-3A with a factory-installed Remote Control Option
0041-13-906	Remote Multifrequency (RMF) Option (for a Model 41-3A w/RC)
5900-00-910	CRT Terminal (115 Volts) with cable
5900-00-911	CRT Terminal (230 Volts) with cable
5900-00-920	MFE Model 2500 Cassette Tape Drive (115 Volts) with cable and one tape
5900-00-921	MFE Model 2500 Cassette Tape Drive (230 Volts) with cable and one tape
5900-00-922	Ten cassette tapes

A. Purpose of the RC Option

1.03 The Model 41-3A is a central office routiner with test call and failure analysis capabilities. It is used to measure the quality of telephone networks, and functions as a maintenance/troubleshooting tool. The basic Model 41-3A can be set up via front panel controls for continuous single number dialing. (Instructions for installing and operating the basic Model 41-3A are provided by instruction manual A0041-13-600.)

> ***Note:*** The TEST RESULTS RESET pushbutton (S24) of the Model 41-3A w/RC must be held depressed for at least five seconds for proper operation.

1.04 The RC Option enables the Model 41-3A to be programmed and controlled from a keyboard terminal or computer, and allows multiple call programming of the Model 41-3A. Report capabilities provided by the TTY Option are fully incorporated as functions of the RC Option, permitting video displays or printouts of test call results.

1.05 In addition, a Model 41-3A w/RC can interface with a 5900-00-920/921 tape drive. This tape drive option includes an MFE Model 2500 Cassette Tape Drive, a male-to-female, point-to-point cable, and one tape. An additional 10 tapes are available under 5900-00-922. If modem operations are required, appropriate modem cables (male-to-male, male-to-female) between the Model 41-3A w/RC and tape drive are a necessity.

B. Functions of the RC Option

1.06 With a Model 41-3A w/RC and terminal (5900-00-910/911) or user-supplied printer (teletype or EIA RS-232C compatible), a user can perform the following:

- Assemble a call program containing several telephone numbers with a unique number of test calls assigned for each telephone number
- Execute the call program
- Obtain a display/printout of test call results.

1.07 If a tape drive (5900-00-920/921) is used, a user can also perform the following:

- Store a call program on tape
- Retrieve a call program from tape
- Store test results on tape.

2. INSTALLATION

2.01 The RC Option is available as a kit for retrofitting a Model 41-3A. The RC Option Retrofit Kit contains:

- Two printed circuit cards
- A PC card cable assembly with mounting hardware
- A special null modem interconnection cable
- Three instruction manuals (A0041-13-600, -602, and -604).

2.02 When a Model 41-3A w/MF is retrofitted, an RMF Option should also be included with the RC Option. The new RMF Option (0041-13-906) is provided as a replacement for the previous MF Option (0041-13-901) which is not compatible with the RC Option. Therefore, the RC Option Retrofit Kit may also include:

- A PROM
- A fourth instruction manual (A0041-13-601).

A. Installation of RC Option

2.03 Installing an RC Option Retrofit Kit into a Model 41-3A requires the following operations.

(1) Set the Model 41-3A's POWER switch down (off).

(2) Remove the Model 41-3A's top cover by removing the rear corner screw on each side of the unit.

(3) If the Model 41-3A being retrofitted contains an MF Option, the RC Option Retrofit Kit should contain an RMF Option in the form of a new PROM and instruction manual A0041-13-601. As shown in this instruction manual, install the new PROM in the memory board supplied by the retrofit kit.

(4) Remove the current memory board (card slot 10) from the Model 41-3A. (Return the removed board to Northeast Electronics.)

(5) Install the new memory board in card slot 10.

(6) The RC Option Retrofit Kit also provides a modified TTY interface board. This board contains switch and strap assemblies that must be set in accordance with the terminal/printer device used with the Model 41-3A. These assemblies (switches TTY S1 and AUX S2, and active/passive straps) are identical to switch and strap assemblies located on the interface board provided by the TTY Option. Therefore, the switch and strap assemblies on the modified TTY interface board are set per instruction manual A0041-13-602 (provided by the RC Option Retrofit Kit).

(7) The modified TTY interface board must be installed in card slot 11 of the Model 41-3A's card cage. If Model 41-3A contains a current TTY interface board, remove that board and replace it with the modified board.

(8) In addition to the two PC cards, the RC Option Retrofit Kit contains a cable assembly which has two female, 25-pin, RS-232C-type connectors at one end and a small connector at the other end. Installation of this cable is required for the Model 41-3A. This required cable installation also applies to a Model 41-3A previously equipped with a TTY Option. Install the new cable per instruction manual A0041-13-602. (This manual is provided by the RC Option Retrofit Kit.)

(9) Replace the top cover of the Model 41-3A w/RC.

B. External Cable Connections

2.04 Figures 1 and 2 illustrate two possible system configurations for a Model 41-3A w/RC. Table B lists the product jacks shown in Figures 1 and 2, and classifies the jacks as to sex and DCE/DTE interface characteristics.

2.05 Appropriate applications of the two cables (male-to-male and male-to-female) shown in Figures 1 and 2 are listed in Table C for various system configurations. Configurations given in Table C do not include configurations which require a user-provided modem. Instead, possible modem configurations and appropriate cable connections are listed separately in Table D.

2.06 As indicated in Table D, a special null modem cable is provided for DCE-to-DCE and DTE-to-DTE type interconnections. Therefore, this cable functions as a DCE-to-DTE or DTE-to-DCE converter, and is identical to the null modem cable supplied with a TTY Option. Pin identification for the null modem cable, a DCE/DTE interface, is given in instruction manual A0041-13-602.

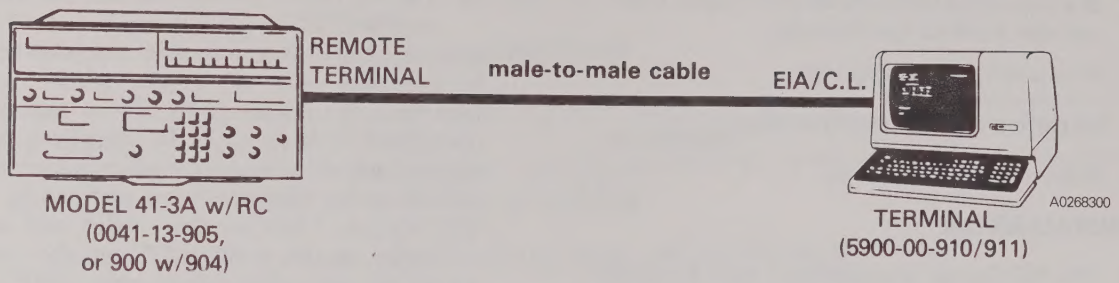

Fig. 1—Model 41-3A w/RC and Terminal

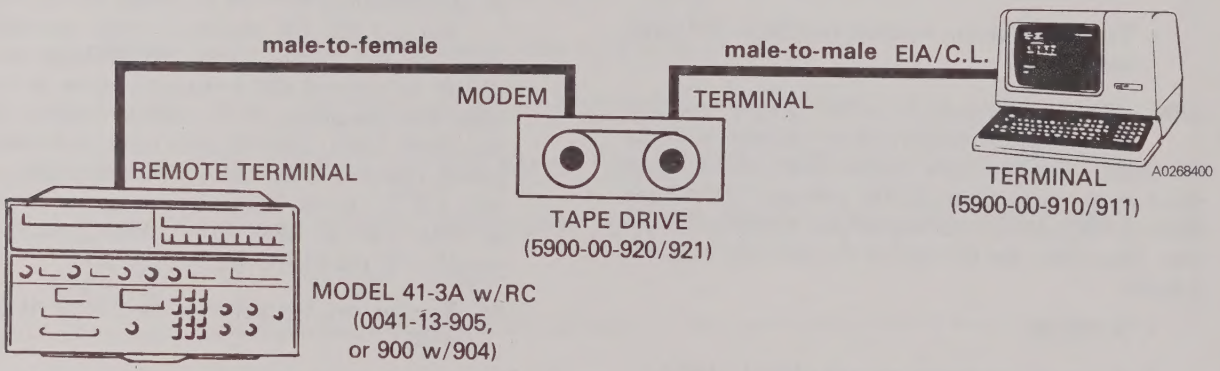

Fig. 2—Model 41-3A w/RC, Tape, and Terminal

TABLE B

JACKS

PRODUCT	JACK	DCE/DTE	SEX
Model 41-3A w/RC	REMOTE TERMINAL	DCE	female
Terminal (5900-00-910/911)	EIA/C.L.	DTE	female
Tape drive (5900-00-920/921)	MODEM	DTE	male
	TERMINAL	DCE	female

TABLE C

PIN-FOR-PIN CABLE CONNECTIONS

PRODUCT CONFIGURATION	JACK CONNECTIONS		CABLE (See Notes)
	FROM	TO	
Model 41-3A w/RC and terminal	REMOTE TERMINAL (Model 41-3A)	EIA/C.L (terminal)	1
Model 41-3A w/RC, tape drive, and terminal	REMOTE TERMINAL (Model 41-3A)	MODEM (tape drive)	2
	TERMINAL (tape drive)	EIA/C.L. (terminal)	1
Model 41-3A and tape drive	REMOTE TERMINAL (Model 41-3A)	MODEM (tape drive)	2
Tape drive and terminal	TERMINAL (tape drive)	EIA/C.L. (terminal)	1

Notes:

Cable 1 = 25-pin, pin-for-pin, male-to-male cable (supplied with a 5900-00-910/911 terminal)

Cable 2 = 25-pin, pin-to-pin, male-to-female cable (supplied with a 5900-00-920/921 tape drive)

TABLE D

NULL MODEM CABLE CONNECTIONS

PRODUCT CONFIGURATION	JACK CONNECTIONS		CABLE (See Notes)
	FROM	TO	
Model 41-3A w/RC and terminal	REMOTE TERMINAL (Model 41-3A)	Modem Interface	3
	Modem Interface	EIA/C.L. (terminal)	1

TABLE D (Cont)

NULL MODEM CABLE CONNECTIONS

PRODUCT CONFIGURATION	JACK CONNECTIONS		CABLE (See Notes)
	FROM	TO	
Model 41-3A w/RC, tape drive, and terminal			
A	REMOTE TERMINAL (Model 41-3A)	MODEM (tape drive)	2
	TERMINAL (tape drive)	Modem Interface	3
	Modem Interface	EIA/C.L. (terminal)	1
B	REMOTE TERMINAL (Model 41-3A)	Modem Interface	3
	Modem Interface	MODEM (tape drive)	2
	TERMINAL (tape drive)	EIA/C.L. (terminal)	1
Model 41-3A and tape drive	REMOTE TERMINAL (Model 41-3A)	Modem Interface	3
	Modem Interface	MODEM (tape drive)	2
Tape drive and terminal	TERMINAL (tape drive)	Modem Interface	3
	Modem Interface	EIA/C.L. (terminal)	1

Notes:

Cable 1 = 25-pin, pin-for-pin, male-to-male cable (supplied with a 5900-00-910/911 terminal)

Cable 2 = 25-pin, pin-to-pin, male-to-female cable (supplied with a 5900-00-920/921 tape drive)

Cable 3 = male-to-male null modem cable (supplied with an RC Option)

C. Baud Rate Adjustments

2.07 All products used in a system configuration must be set at the same baud rate. Acceptable rates are 110, 300, and 1200.

2.08 Baud rate adjustments for the Model 41-3A w/RC are made in accordance with the baud rate instructions given in manual A0041-13-602. The 5900-00-920/921 tape drive has a front panel switch for baud rate selection. The 5900-00-910/911 terminal has bit switches on the rear panel for selecting baud rate. When all product baud rates are adjusted, cycle power at the terminal.

3. OPERATION

3.01 The RC Option enables the Model 41-3A to be operated and programmed from a terminal. Keyboard entries available to an operator include function commands and call programming. The function commands are discussed under subsection A below, and call programming is discussed under subsection B. Finally, subsection C provides examples which illustrate the use of function commands and call programming.

A. Function Commands

3.02 As shown in Table E, function commands invoke various system modes consisting of reset, ready, set time (clock), edit, busy, and operate conditions. An appropriate RESET SYSTEM, SYSTEM READY, SET TIME MODE, EDITING MODE, SYSTEM BUSY, or OPERATE MODE message at the terminal indicates the mode condition. Following a RESET SYSTEM message, a SYSTEM READY mode is required for the use of function commands other than a reset command. The Model 41-3A automatically returns to a system ready condition following the execution of certain functions and keyboard entries.

Note: For commands such as CTRL Z, CTRL T, CTRL E, etc., the CTRL (CONTROL) key is held depressed while the letter key is pressed. For commands such as S RET and N RET, the RET (RETURN) key is pressed after the letter is keyed.

TABLE E

FUNCTION COMMANDS

FUNCTION	COMMAND	DESCRIPTION
RESET	CTRL Z	Initializes the Model 41-3A and places it in a SYSTEM READY mode, where it can be operated from its own controls, or operated from a terminal. The SYSTEM READY message permits the use of other function commands.
CLOCK	CTRL T	Invokes the SET TIME MODE; wherein, the 24-hour clock of the Model 41-3A can be set for the correct time of day
REPORT	A	Programs the Model 41-3A to send an individual call report for each test call attempted
	E	Programs the Model 41-3A to send an exception report for a test call that does not result in a test OK
	T	Programs the Model 41-3A to send a summary report for all test calls made to a telephone number
	H	Programs the Model 41-3A to automatically transmit summary reports every hour on the hour
	CTRL H	Cancels a programmed H report selection
	CTRL P	Cancels all programmed A, E, T, and H report selections
	CTRL C	Clears all counts accumulated by the TEST RESULTS controls of the Model 41-3A (see manual A0041-13-600)

TABLE E (Cont)

FUNCTION COMMANDS

FUNCTION	COMMAND	DESCRIPTION
EDIT	CTRL E	Invokes the EDITING MODE in which a call program can be assembled or edited. The CTRL E command is also used to exit the EDITING MODE and return to the SYSTEM READY mode.
	CTRL F	Displays the next line of the call program
	CTRL B	Displays the previous line of the call program
	S RET	Deletes a displayed control instruction from the call program of the Model 41-3A
	N RET	Deletes a displayed dialing number instruction from the call program of the Model 41-3A
	CTRL C	Deletes the entire call program of the Model 41-3A
	CTRL U	Cancels an assembled instruction prior to a RET key entry
	RUBOUT or DELETE	Cancels a single character from an assembled dialing number instruction
LOAD	CTRL L	Invokes a SYSTEM BUSY mode during which the Model 41-3A's call program is loaded on tape
DUMP	CTRL D	Invokes a SYSTEM BUSY mode from which the user can key a digit 1 to transfer a call program from tape to the Model 41-3A, or the user can key a digit 2 to transfer both call program and test reports from tape to the terminal controller. This transfer of test reports can be interrupted by keying any character within a 3-second pause which follows a transferred summary report. The 3-second period is preceded by the > prompt and occurs only if the summary report was not due to a 413A HELD condition. A CTRL Q entry then continues the transfer of test reports. A CTRL S command stops the dump operation.
OPERATE	CTRL O	Invokes the OPERATE MODE from which the user can key a digit 1 or 5 to cause the Model 41-3A to execute its own call program, or key a digit 2 to cause the Model 41-3A to first retrieve a call program from tape and then execute that call program. ***Note:*** A digit 5 selection is the same as a digit 1 selection except that a digit 5 operation is used for a printer with "auto-wakeup." The dialing of a telephone number programmed for more than one call can be interrupted by another CTRL O entry. Keying CTRL O before the last call of a number causes a summary report and a 413A HELD message. Keying a digit 4 then causes a summary report and an exit from the OPERATE MODE. A digit 3 continues programmed dialing. An interruption can also be due to a programmed hold condition. The digit 3 must then be keyed twice to continue programmed dialing. Again, a digit 4 ends the OPERATE MODE.

3.03 Reset Command

3.04 After the Model 41-3A w/RC is powered up or its ac power is returned after an interruption, a RESET SYSTEM message is sent to the terminal. Use of the Model 41-3A's RESET pushbutton or a keyboard CTRL Z command is then required to initialize the system and to cause an initial SYSTEM READY message at the terminal. The system ready message is required for the use of function commands other than a reset command. After an initial SYSTEM READY condition the CTRL Z command can be used at any time to again invoke the RESET SYSTEM mode. Following the RESET SYSTEM message, a keyboard entry other than CTRL Z causes a retransmission of the RESET SYSTEM message.

> ***Note:*** Spurious noise at power-up may disable the reset command. If so, repower the terminal, then key the reset command. Also, check that the keyboard CAPS LOCK key is set, and the tape drive (if used) is turned on.

3.05 Clock Command

3.06 The clock command (CTRL T) is used to set the 24-hour clock of the Model 41-3A. The response to a clock command is a SET TIME MODE message. A time-of-day entry consisting of hour and minute entries programs the 24-hour clock.

3.07 The format for a time entry is hhmm, where hh is the hour and mm is the minutes as shown in Table F.

TABLE F

EXAMPLE TIME ENTRIES

TIME OF DAY	ENTRY
12:30 am	0030
12:30 pm	1230
9:18 am	0918
9:45 pm	2145

3.08 Correct entries are based on a 2400-hour period, i.e., 12 midnight is entered as 2400. No error checking is done on time entries; a time entry of 6500, for example, will set the clock to 6500 hours. Any clock setting beyond 2460 will automatically be reset to an initial 0000 setting within 10 minutes.

3.09 Report Commands

3.10 Test result reports are automatically sent by the Model 41-3A as it executes a call program. The report commands enable a user to obtain selected reports in addition to the reports normally provided. Report selections can be made immediately following a SYSTEM READY message. These RC Option report commands serve the same purpose as the TTY Option report commands. Therefore, the report commands and display/printout formats for both options are the same. (See instruction manual A0041-13-602 for a typical example of call, exception, and summary reports.)

3.11 In addition to four report selections (A, E, H, and T), two report cancellation commands (CTRL H and CTRL P) as well as a clear command (CTRL C) are also available. The cancellation commands allow an operator to request types of reports as needed, and to cancel requests no longer desired. The clear command enables an operator to remove old test result counts stored in the Model 41-3A. Reports which then follow contain only current information.

3.12 Editing Commands

3.13 Editing commands are used to initially assemble and store a call program in the Model 41-3A w/RC. Edit commands are also used to delete, edit, or replace a call program currently stored in the Model 41-3A.

3.14 The edit commands include the editing mode command (CTRL E) as well as several editing commands which are functional only when the Model 41-3A is in the editing mode. The Model 41-3A transmits an EDITING MODE message to signal its editing mode. Other editing commands, such as display control commands (CTRL F and CTRL B) and editing control commands (CTRL C, S RET, N RET, RUBOUT or DELETE, and CTRL U), are then available as needed. The CTRL E command is also used to exit the EDITING MODE and return to the SYSTEM READY mode.

3.15 Once the editing mode is invoked, an entire call program previously stored in the Model 41-3A can be deleted at any time by use of the CTRL C command, and a new call program assembled and stored. If not deleted, a terminal display of the complete call program can be obtained by use of the CTRL F command. Repeated use of this command advances the display line-by-line through the call program. This forward order of display can be reversed by use of the CTRL B command.

3.16 As an individual instruction of the call program is displayed, a new instruction can be assembled and entered as a replacement for the displayed instruction. The RET key is used to store a new instruction. Prior to keying this RET, a new instruction can be canceled in whole by using the CTRL U command. Also, address digits of an assembled dialing number instruction can be cancelled by using the RUBOUT (or DELETE) key.

3.17 Load Command

3.18 The CTRL L load command is used to transfer the call program of the Model 41-3A to the tape drive. This command also causes the call program to be sent to the terminal for display as it is being stored on tape.

3.19 A SYSTEM BUSY message is sent to the terminal before the call program is transferred. The call program is stored at the beginning of the tape. The remainder of the tape is erased. The tape is then rewound. The Model 41-3A sends a SYSTEM READY message to the terminal when transfer of the call program is complete.

3.20 Dump Commands

3.21 The CTRL D dump command is used to transfer information stored on tape. A SYSTEM BUSY message is sent to the terminal before the information is transferred, and a SYSTEM READY message is sent after completion of the transfer. Whether the transferred information is sent from tape to the Model 41-3A or to the terminal is determined by keying the digit 1 or 2 after CTRL D is keyed.

3.22 When a digit 1 is keyed after the CTRL D command, the call program stored on tape is sent to the Model 41-3A.

3.23 When a digit 2 is keyed after the CTRL D command, both the call program and any test reports stored on tape are sent to the terminal. The transfer of these test reports can be interrupted. A prompt (>) is sent to the terminal following the transfer of a summary report. Provided the summary report was not due to a 413A HELD condition, a delay of approximately 3 seconds then occurs before other information is transferred. If any keyboard character is keyed within this 3-second period, the transfer of other information is prevented. This interruption remains until a CTRL Q command is used to continue the transfer operation, or a CTRL S command is keyed to stop the operation altogether.

3.24 Operate Commands

3.25 An initial CTRL O entry together with a selected digit entry causes the Model 41-3A to begin a programmed dialing operation. While the Model 41-3A is functioning, a second CTRL O entry can be used to suspend testing until a selected digit entry is used to continue, or to end the programmed operation.

3.26 Keying digit 1 after the CTRL O entry causes the Model 41-3A to function under control of the call program currently stored in the Model 41-3A. The Model 41-3A sends an OPERATE MODE message in response to this mode command, and automatically sends summary reports for each telephone number contained in the call program. If report command A is keyed prior to this operate command, individual reports (one for each test call) are also sent.

3.27 Keying a digit 5 also causes the Model 41-3A to function under control of the call program stored in the Model 41-3A, and to transmit the same messages and reports. In addition, null-character transmissions are included for use by a printer with an "auto-wakeup" feature. In particular, 800 milliseconds of null-character transmission precede a test report, and 200 milliseconds of null characters are sent after a carriage return. (Note that these additional null characters reduce the data storage capacity of a tape.)

3.28 Keying digit 2 after the CTRL O entry causes the Model 41-3A to operate under control of the call program stored on tape. The Model 41-3A sends a SYSTEM BUSY message in response to this mode command, and automatically provides summary reports. If report command A or E is entered prior to the operate command, individual call or exception reports are also sent.

3.29 When a telephone number is programmed to be dialed more than once, an interruption in the dialing of that number can be effected by another CTRL O. Keying CTRL O before the last call of the number causes the Model 41-3A to send a summary report and a 413A HELD message. Keying digit 4 then causes the Model 41-3A to again send a summary report and to exit the OPERATE MODE. If instead of digit 4, a digit 3 is keyed, the Model 41-3A continues its programmed dialing functions.

3.30 The 413A HELD message may also occur if the Model 41-3A is programmed to hold on a fault condition. An exception report precedes the 413A HELD message. Keying digit 4 then causes the

Model 41-3A to send a summary report and to exit the OPERATE MODE. Or, to continue programmed dialing instead, digit 3 must be keyed twice. The first 3 is used to silence an audible, 413A HELD alarm at the Model 41-3A, and the second 3 continues the programmed operation.

B. Call Programming

3.31 The Model 41-3A w/RC can be programmed for dialing operations by appropriate front panel control settings, or by keyboard commands from a terminal controller. Upon receipt of the SYSTEM READY message, editing commands permit the assembly and storage of a call program in the Model 41-3A. Editing commands also allow the re-editing of a call program stored in the Model 41-3A. A reset command (CTRL Z) deletes a call program stored in the Model 41-3A.

3.32 Call Program

3.33 A call program consists of control and dialing number instructions. A control instruction is usually followed by one or more associated dialing number instructions. The first programmable line of a call program is displayed at the terminal after the EDITING MODE is invoked (see CTRL E command). If an instruction is stored here, it will appear to the right of the first prompt (>) following the EDITING MODE message. An edit cursor (□) then appears to the right of an edit prompt which is positioned below the first line of the call program. As a line is programmed (edited, deleted, etc.), the cursor is advanced to the next programmable line of the call program. A total of thirty-two 16-character lines can be stored in a call program. The edit cursor cannot advance beyond the last line of a call program, or move back beyond the first line of a call program.

3.34 Control Instruction

3.35 A control instruction overrides the control functions of some, but not all panel-mounted controls of the Model 41-3A. Panel controls not replaced by the control instruction continue to affect the operation of the Model 41-3A during its execution of a call program. When the call program contains no control instructions, the Model 41-3A executes all dialing number instructions in accordance with front panel control settings. It is important, therefore, that all front panel controls be preset for user-selected conditions and parameters. Installation and Operation Manual A9041-3-600 provides instruction on the use of all front panel controls.

3.36 The keyboard format for a control instruction is SsDdFfHhhhhTt followed by an A, B, Al, Bl, AB, or no entry. As shown in Table G, each uppercase letter (S, D, F, H, T, and A or B, etc.) denotes a type of instruction, while lowercase letters (s, d, f, hhhh, ttt, and l) indicate specific parameter selections. After an Ss is keyed, each succeeding uppercase letter, except a channel/line code, is automatically displayed at the terminal after a parameter selection. Each uppercase letter displayed requires a parameter selection.

3.37 To store an assembled instruction into the Model 41-3A, the RETURN key (denoted RET) is keyed (without a space) after the last parameter selection.

3.38 Start Dial Parameter

3.39 The start dial parameter programs one or both of two start dial conditions and replaces the control functions of the DELAY and DIAL TONE pushbuttons (START DIAL COMMAND).

3.40 The first selection (s = 1) permits dialing to begin after a preset time interval expires following a line seizure (off-hook indication). Also, when a dialing number instruction contains a wait-for-start-dial (WSD) condition, the same delay condition must be satisfied before dialing can resume. The preset time interval is determined by the START AFTER control setting.

3.41 The second selection (s = 2) allows dialing to begin or resume upon receipt of dial tone. If the Model 41-3A is equipped with the MF Option, the dial tone selection includes wink and similar start dial signals, and dialing begins or resumes when either dial tone or wink is received. The maximum wait period for a dial tone indication is determined by the START AFTER control setting.

3.42 The third selection (s = 3) provides a special start dial condition, used primarily with a Model 4101 or 4101A Identifier. This selection permits the Model 41-3A to:

(a) begin dialing when dial tone (or an MF wink signal) is received after an initial off-hook indication

(b) and, when WSD commands are programmed, to resume dialing after a preset time interval expires. The time interval is determined by the FAULT AFTER control setting.

3.43 Dialing Parameter

3.44 The dialing parameter programs the type of dialing and replaces the control function of the TT/MF/DP toggle switch (DIALER PROGRAM). The dial pulse (DP), dual-tone multifrequency (TT), or multifrequency (MF) dialing selections require various presettings of the SPEED, % BREAK, and IDT thumbwheels, and of the LEAK/ LOOP switches.

3.45 The dial pulse (d = 1) selection requires appropriate settings of the SPEED, % BREAK, and IDT thumbwheels, and of the LEAK/LOOP switches.

3.46 The dual-tone multifrequency (d = 2) selection requires appropriate settings of the SPEED and % BREAK thumbwheels.

3.47 The multifrequency (d = 4) selection is enabled only when the Model 41-3A is equipped with the multifrequency option, and requires presettings of the SPEED and % BREAK thumbwheels.

3.48 Fault Parameter

3.49 The fault parameter replaces the control functions of the OPEN C-LEAD and REV DRNG-DIAL pushbuttons, and programs none, one, or both of two conditions which will cause a fault condition.

3.50 When the no-fault (f = 0) selection is made, the Model 41-3A ignores an open C-lead or tip/ring polarity reversal during dialing.

3.51 The open C-lead selection (f = 1) causes a fault condition when an open C-lead is detected.

3.52 The tip/ring polarity reversal during dialing selection (f = 2) causes a fault condition when a tip/ring polarity reversal is detected during dialing. (The T/R reversal discloses reversed wipers in SXS switch trains and faulty message accounting equipment.)

3.53 The third selection (f = 3) causes a fault condition when an open C-lead or a tip/ring polarity reversal during dialing is detected.

3.54 Hold Parameter

3.55 Hold parameter hhhh sets conditions which cause the Model 41-3A to halt operation and hold the line under test. The HOLD ON pushbuttons replaced by the hold parameter are REORDER, BUSY, R or B + ANSWER, and FAULT. A 4-digit parameter entry is required.

3.56 Single or combined reorder, busy, and fault hold conditions as well as a no-hold condition can be selected. A no-hold condition is set only when the parameter entry contains all zeros, i.e., hhhh = 0000. Any digit sequence other than four zeros sets one or more hold conditions. For example, parameter entry hhhh = 0002 sets a busy-hold condition, whereas hhhh = 1200 sets both a reorder and busy hold condition.

3.57 A reorder selection programs the Model 41-3A to halt when a reorder tone is received without a false tip/ring polarity reversal (answer) indication. The reorder selection is programmed by placing digit 1 in one or more positions of the hhhh format, e.g., hhhh = 1000, 0100, 0010, 0001, 1100, 1010, 1001, etc.

3.58 A busy selection programs the Model 41-3A to halt when a busy tone is received without a false tip/ring polarity reversal (answer) indication. The busy selection is programmed by placing digit 2 in any or all digit positions of the hhhh parameter format, e.g., hhhh = 2000, 0200, 0020, 0002, 2200, 2020, 2002, etc.

3.59 A combined reorder or busy-with-answer selection programs the Model 41-3A to halt when a false tip/ring polarity reversal (answer) indication and a reorder or busy tone are received. This selection is programmed by placing digit 4 in any or all digit positions of the hhhh parameter format, e.g., hhhh = 4000, 0400, 0040, 0004, 4400, 4040, 4004, etc.

3.60 A fault hold selection programs the Model 41-3A to halt when a fault condition is detected. The fault conditions are as programmed by fault condition parameter Ff, and include the no-dial tone (or no wink) conditions. The fault hold selection is programmed by placing digit 8 in any or all digit positions of the hhhh parameter format, e.g., hhhh = 8000, 0800, 0080, 0008, 8800, 8080, 8008, etc.

3.61 Test Complete Parameter

3.62 The test-complete parameter programs call completion conditions and replaces the control functions of the ANS SUP, 1KHZ TONE, and INC CKT pushbuttons. To record a test OK for each test call, the selected test complete requirement must be detected. Single or various combinations of answer supervision, 1-kHz tone, and incoming circuit detection requirements can be selected.

3.63 The first selection (t = 1) requires detection of a tip/ring polarity reversal.

3.64 The 1-kHz tone source for the second selection (t = 2) can be the Model 41-3A's built-in test line or another source such as a type 102 test line. Expected and acceptable upper and lower limits for tone detection are determined by DB control settings.

3.65 The third selection (t = 3) is a combination of the first and second selections.

3.66 The fourth selection (t = 4) requires detection of a completed call to the internal test line of the Model 41-3A; therefore, the INCOMING CIRCUIT terminals must connect to an incoming circuit.

3.67 The fifth selection (t = 5) combines the requirements of the first and fourth selections.

3.68 The sixth selection (t = 6) combines the requirements of the second and fourth selections.

3.69 The seventh selection (t = 7) combines the requirements of the first, second, and fourth selections.

3.70 Channel/Line Parameter

3.71 The channel/line parameter determines which channel (A or B, or both) and which line/s (0 through 7) are engaged for testing. The channel/line parameter replaces the control functions of the A TEST and B TEST pushbuttons.

3.72 If only A is keyed and parameter 1 is not specified, all Channel A lines are engaged.

3.73 If only B is keyed and parameter 1 is not specified, all Channel B lines are engaged.

3.74 If AB is keyed and parameter 1 is not specified, or if no channel/line selection is made, both Channel A and B lines are engaged.

3.75 Only a single line of Channel A is engaged when A is keyed with parameter 1 specified as 0, 1, 2, 3, 4, 5, 6, or 7.

3.76 Only a single line of Channel B is engaged when B is keyed with parameter 1 specified as 0, 1, 2, 3, 4, 5, 6, or 7.

TABLE G

CONTROL INSTRUCTION PARAMETERS

INSTRUCTION	PARAMETER SELECTIONS
S = Start Dial	s = 1 = delay or 2 = dial tone or 3 = delay and dial tone ***Note:*** If the Model 41-3A is equipped with an MF Option, the dial tone selection includes wink and similar start dial signals. Dialing begins or resumes when either dial tone or wink is received. The maximum wait period for a dial tone indication is determined by the START AFTER control setting.
D = Dialing	d = 1 = DP dialing or 2 = TT dialing or 4 = MF dialing
F = Fault	f = 0 = no fault or 1 = open C-lead or 2 = tip/ring polarity reversal during dialing or 3 = open C-lead and tip/ring polarity reversal during dialing

TABLE G (Cont)

CONTROL INSTRUCTION PARAMETERS

INSTRUCTION	PARAMETER SELECTIONS
H = Hold	hhhh = four individual selections of h where: h = 0 = no hold or 1 = reorder or 2 = busy or 4 = reorder/busy with answer or 8 = fault
Test Complete	t = 1 = answer supervision event or 2 = 1-kHz tone or 3 = answer and 1-kHz or 4 = incoming circuit or 5 = answer and incoming circuit or 6 = 1-kHz and incoming circuit or 7 = answer, 1-kHz, and incoming circuit
Line Control	A = All Channel A lines B = All Channel B lines A1 = A single Channel A line, where 1 designates the specific line (1 = 0, 1, . . ., 6, or 7)

TABLE G (Cont)

CONTROL INSTRUCTION PARAMETERS

INSTRUCTION	PARAMETER SELECTIONS
Line Control (Cont)	B1 = A single Channel B line, where 1 designates the specific line (1 = 0, 1, . . . , 6, or 7) AB (or no entry) = All lines of both Channels A and B

3.77 Dialing Number Instruction

3.78 A dialing number instruction provides the Model 41-3A with a telephone number to be dialed and the number of test calls to be made. Also, a special wait-for-start-dial (WSD) instruction and a special end-of-number (EON) instruction can be programmed with the telephone number.

3.79 The dialing number format is Ncccc, m . . . m, where N designates "number of test calls", and cccc specifies a number from 1 to 9999, i.e., cccc must be greater than 0 and less than 10,000 ($0000 < cccc \leq 9999$). This information is separated with a comma from the telephone number to be dialed, m . . . m. Inserting a W in the telephone number (e.g., 9W2246511) programs a wait-for-start-dial (WSD) condition. For CAMA operations and a Model 41-3A w/RC also equipped with the multifrequency option, an E placed on the end of the telephone number designates the end of the called number. Including W and E, and digits, the entered telephone number can consist of up to 32 characters.

3.80 To store an assembled instruction into the Model 41-3A, the RETURN key (denoted as RET) is keyed (without a space) after the last character selection.

C. Command and Call Programming Examples

3.81 Function command and call programming examples are provided by Table H. Although actual command usage and call programming are determined by the user, the related step-by-step examples should be examined in the order presented to make clear the purpose and function of the various commands.

3.82 Table H begins with an initial RESET SYSTEM message, which is displayed at the terminal (or is printed at a user-provided teletype or EIA RS-232C compatible printer) once the Model 41-3A w/RC, terminal, and tape drive (if used) are turned on. Following this initial RESET SYSTEM message, the system can be reset by use of the RESET switch on the Model 41-3A, or by the reset command as shown in STEP 2 of Table H.

TABLE H

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
1		RESET SYSTEM >□	Initial display after the Model 41-3A, CRT terminal, and tape drive are turned on.
2	CTRL Z	SYSTEM READY >□	If necessary, repower the terminal before keying CTRL Z to obtain a SYSTEM READY message. Also, check the CAPS LOCK key on the terminal.
3	CTRL T	TIME 0000 SET TIME MODE >□	The current time of the Model 41-3A's 24-hour clock is shown, and the set-time mode is invoked.
4	830 RET	>830 TIME 0000 SYSTEM READY >□	A partial incorrect time entry is canceled.
5	CTRL T	TIME 0000 SET TIME MODE >□	The current time of the Model 41-3A's 24-hour clock is shown, and the set-time mode is invoked.
6	0830	>0830 TIME 0830 SYSTEM READY >□	The 24-hour clock is set to 8:30 am.
7	CTRL E	EDITING MODE > >□	The cursor (□) is positioned so that the first line of a call program can be assembled, edited, or deleted. For this example, no instruction is stored at the first line.
8	S12180001 CTRL U	>S1D2F1H8000T1 > >□	A control instruction is assembled, but canceled before a RET is keyed.

TABLE H (Cont)

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
9	S12100001A1 RET	>S1D2F1H0000T1A1* > >□	A control instruction is assembled and stored in the Model 41-3A. After S is keyed, D, F, H, and T are displayed as parameters 1, 2, 1, and 0000 are keyed. Channel/line selection A1 is then entered. All the lines of both Channel A and B are programmed for testing if no channel/line entry is made. The edit cursor is advanced to the next programmable line.
10	N100,2246533 RET	>N100,2246533* > >□	A dialing number instruction is stored in the Model 41-3A.
11	N200022456	>N2000,22456□	A second dialing number instruction is begun.
12	RUBOUT RUBOUT	>N2000,22456\6\5□	Digits 5 and 6 are deleted.
13	6523 RET	>N2000,22456\6\56523* > >□	Telephone number 2246523 is stored in the Model 41-3A.
14	S32180001 RET	>S3D2F1H8000T1* > >□	Another control instruction is stored in the Model 41-3A.
15	CTRL B CTRL B	>S3D2F1H8000T1* >N2000,2246523* >□	The display is moved back two lines. Instruction N2000,22466523 can be edited, canceled, or deleted.
16	N RET	>N >S3D2F1H8000T1* >□	Instruction N2000,2246523* is deleted from the call program.
17	S RET	>S > >□	Instruction S3D2F1H8000T is deleted from the call program.
18	CTRL B CTRL B CTRL B CTRL B CTRL B	> >N100,2246533* >S1D2F1H0000T1A1* >S1D2F1H0000T1A1* >□	The display is moved back to the beginning of the call program.
19	CTRL F	>N100,2246533* >□	The display is advanced one line.

TABLE H (Cont)

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
20	N5,2246501 RET N5,2246502 RET • • • N5,2246530 RET N5,2246531 RET	>N5,2246501* > >N5,2246502* > • • • >N5,2246530* > >N5,2246531* >N5,2246531* >□	Instruction N5,2246501 replaces N100,2246533, and 28 dialing number instructions are added to the call program. Note that the last instruction, N5,2246531, appears twice in the display because it is the last programmable line (32 lines total) of the call program. Any instruction entered at this point will replace the last entry.
21	CTRL E	SYSTEM READY >□	The editing mode is exited.
22	CTRL L	SYSTEM BUSY >22222222222 S1D2F1H0000T1A1 N5,2246501 • • • N5,2246531 > SYSTEM READY >□	The Model 41-3A's call program is sent to the tape drive. The transmitted 2s are tape control characters. The CTRL L operation requires a completion time of approximately 2 minutes.
23	CTRL E	EDITING MODE >S1D2F1H0000T1A1* >□	The editing mode is invoked.
24	CTRL C	EDITING MODE > >□	The entire call program is deleted from the Model 41-3A.
25	CTRL E	SYSTEM READY >□	The editing mode is exited.

TABLE H (Cont)

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
26	CTRL D 1	> SYSTEM BUSY >FF (Call Program) SYSTEM READY >□	The call program stored on tape is sent to the Model 41-3A. The transmitted Fs are tape control characters. A CTRL D operation requires a completion time of 1 to 3 minutes.
27	A	>A	The Model 41-3A is programmed to send an individual call report for each test call attempted.
28	CTRL O 1	OPERATE MODE >FFFFFFFFFFF > (Call and Summary Test Reports) > SYSTEM BUSY > SYSTEM READY >□	The Operate Mode is invoked and mode parameter digit 1 is selected. The Fs are control characters which precede test reports sent to the tape drive during execution of the call program. The message signals a delay period of approximately 2 minutes before the Operate Mode is exited.
29	CTRL D 2	> SYSTEM BUSY >FF (Call Program) > (Reports) > SYSTEM READY >□	The call program and test reports stored on tape are retrieved. The CTRL D2 operation may require several minutes for completion.

TABLE H (Cont)

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
20	N5,2246501 RET N5,2246502 RET • • • N5,2246530 RET N5,2246531 RET	>N5,2246501* > >N5,2246502* > • • • >N5,2246530* > >N5,2246531* >N5,2246531* >□	Instruction N5,2246501 replaces N100,2246533, and 28 dialing number instructions are added to the call program. Note that the last instruction, N5,2246531, appears twice in the display because it is the last programmable line (32 lines total) of the call program. Any instruction entered at this point will replace the last entry.
21	CTRL E	SYSTEM READY >□	The editing mode is exited.
22	CTRL L	SYSTEM BUSY >22222222222 S1D2F1H0000T1A1 N5,2246501 • • • N5,2246531 > SYSTEM READY >□	The Model 41-3A's call program is sent to the tape drive. The transmitted 2s are tape control characters. The CTRL L operation requires a completion time of approximately 2 minutes.
23	CTRL E	EDITING MODE >S1D2F1H0000T1A1* >□	The editing mode is invoked.
24	CTRL C	EDITING MODE > >□	The entire call program is deleted from the Model 41-3A.
25	CTRL E	SYSTEM READY >□	The editing mode is exited.

TABLE H (Cont)

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
26	CTRL D 1	> SYSTEM BUSY >FF (Call Program) SYSTEM READY >□	The call program stored on tape is sent to the Model 41-3A. The transmitted Fs are tape control characters. A CTRL D operation requires a completion time of 1 to 3 minutes.
27	A	>A	The Model 41-3A is programmed to send an individual call report for each test call attempted.
28	CTRL O 1	OPERATE MODE >FFFFFFFFFFF > (Call and Summary Test Reports) > SYSTEM BUSY > SYSTEM READY >□	The Operate Mode is invoked and mode parameter digit 1 is selected. The Fs are control characters which precede test reports sent to the tape drive during execution of the call program. The message signals a delay period of approximately 2 minutes before the Operate Mode is exited.
29	CTRL D 2	> SYSTEM BUSY >FF (Call Program) > (Reports) > SYSTEM READY >□	The call program and test reports stored on tape are retrieved. The CTRL D2 operation may require several minutes for completion.

TABLE H (Cont)

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
20	N5,2246501 RET N5,2246502 RET • • • N5,2246530 RET N5,2246531 RET	>N5,2246501* > >N5,2246502* > • • • >N5,2246530* > >N5,2246531* >N5,2246531* >□	Instruction N5,2246501 replaces N100,2246533, and 28 dialing number instructions are added to the call program. Note that the last instruction, N5,2246531, appears twice in the display because it is the last programmable line (32 lines total) of the call program. Any instruction entered at this point will replace the last entry.
21	CTRL E	SYSTEM READY >□	The editing mode is exited.
22	CTRL L	SYSTEM BUSY >22222222222 S1D2F1H0000T1A1 N5,2246501 • • • N5,2246531 > SYSTEM READY >□	The Model 41-3A's call program is sent to the tape drive. The transmitted 2s are tape control characters. The CTRL L operation requires a completion time of approximately 2 minutes.
23	CTRL E	EDITING MODE >S1D2F1H0000T1A1* >□	The editing mode is invoked.
24	CTRL C	EDITING MODE > >□	The entire call program is deleted from the Model 41-3A.
25	CTRL E	SYSTEM READY >□	The editing mode is exited.

TABLE H (Cont)

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
26	CTRL D 1	> SYSTEM BUSY >FF (Call Program) SYSTEM READY >□	The call program stored on tape is sent to the Model 41-3A. The transmitted Fs are tape control characters. A CTRL D operation requires a completion time of 1 to 3 minutes.
27	A	>A	The Model 41-3A is programmed to send an individual call report for each test call attempted.
28	CTRL O 1	OPERATE MODE >FFFFFFFFFFF > (Call and Summary Test Reports) > SYSTEM BUSY > SYSTEM READY >□	The Operate Mode is invoked and mode parameter digit 1 is selected. The Fs are control characters which precede test reports sent to the tape drive during execution of the call program. The message signals a delay period of approximately 2 minutes before the Operate Mode is exited.
29	CTRL D 2	> SYSTEM BUSY >FF (Call Program) > (Reports) SYSTEM READY >□	The call program and test reports stored on tape are retrieved. The CTRL D2 operation may require several minutes for completion.

TABLE H (Cont)

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
30	CTRL P	>P□	A previous request for individual call reports is canceled.
31	CTRL C	>C□	Previous test results stored in the Model 41-3A are cleared.
32	CTRL O 1 3	OPERATE MODE >FFFFFFFFFFF > (Summary Report) 413A HELD > (Summary Reports) > SYSTEM BUSY > SYSTEM READY >□	The Operate Mode is invoked and mode parameter digit 1 is selected. The second CTRL O command (keyed immediately following the last F for this example) interrupts the Model 41-3A. The digit 3 then releases this 413A HELD condition.
33	CTRL D 2 X CTRL Q Y CTRL S	> SYSTEM BUSY >FF (Call Program) (Test Reports) (Summary Report) > (interruption) (Test Reports) (Summary Report) > (interruption) > SYSTEM BUSY > SYSTEM READY >□	The X (or any keyboard character) keyed within a 3-second period following the first summary report, causes an interruption. The CTRL Q releases this interruption. The Y (or any character) causes a second interruption. The CTRL S ends the dump operation.

TABLE H (Cont)

COMMAND AND PROGRAMMING EXAMPLES

STEP	TERMINAL KEYBOARD	TERMINAL DISPLAY	COMMENTS
34	CTRL E	EDITING MODE >S1D2F1H0000T1A1* >□	The editing mode is invoked.
35	S12180001A1 RET	>S1D2F1H8000T1A1* >N1,2246501* >□	A hold-on-fault condition (parameter H) is added to instruction S1D2H0000T1A1.
36	CTRL E	SYSTEM READY >□	The editing mode is exited.
37	CTRL O 1 3 4	OPERATE MODE >FFFFFFFFFFF > (Exception Report) 413A HELD > (Exception Report) 413A HELD >4 (Summary Report) > SYSTEM BUSY > SYSTEM READY >□	The Operate Mode is invoked and mode parameter digit 1 is selected. The exception report and 413A HELD Message indicate a hold-on-fault condition. The first digit 3 is used to silence the audible alarm at the Model 41-3A. A second 3 would allow the Model 41-3A to continue through the call program, but a digit 4 is keyed instead, causing an exit from the Operate Mode.

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